EXECUTIVE SUMMARY

BACKGROUND

Bharat Petroleum Corporation Ltd. (BPCL) is engaged in production and marketing of petroleum products. It is India's one of the largest commercial enterprises and Navaratna oil company. BPCL is the project proponent for construction of additional tankage for ATF & MS & other allied facilities within plant premises of Borkhedi POL Depot. The objective of this report is to get environmental clearance from MoEF/SEAC.

Borkhedi Depot is located in south-western direction near Borkhedi Village at a distance of about 35 Km from Nagpur City under Nagpur Tehsil/district in the state of Maharashtra. It is an ISO 9001-2008 and ISO 14001:2004 certified unit of BPCL commissioned in the year 2003. The depot facilitates receipt, storage & dispatch of various petroleum products like EURO III / IV MS, EURO III / IV SPEED, EUROIII / IV HSD, SKO, ATF, Ethanol, Bio-diesel etc. The input to the depot is mainly from BPCL Manmad through rail tankers. The depot is spread over an area of 27.41 acres of land provided by State Government. Geographically, the depot is located at 20^0 51'28.6" N Latitude and 78^0 58'11.6" E Longitude at an altitude of about 269 m from mean sea level (MSL). The depot is well connected with road and rail communication. National Highway NH-7 is passing in southern direction at a distance of about 0.5 km away from the depot. The nearest Railway station is Borkhedi railway station, which is located at a distance of about 1 Km.

There has been sharp increase in aviation activities of Nagpur Airport. A number of domestic as well as international flights have been added from Nagpur Airport. This has resulted in increase in demand of Aviation Turbine Fuel (ATF). Due to increase in numbers of two wheelers and four wheelers in and around Nagpur, the demand of MS has substantially increased. The present storage and supply facilities are inadequate to meet the ever growing requirement of MS and ATF. In view of the above, BPCL proposes for augmentation of the existing storage of ATF & MS and related facilities of Borkhedi Depot.

As per EIA Notification, published in Gazette of India, Extraordinary Part-II, Section-3, sub-section (ii) of Ministry of Environment & Forest dated 14.09.2006 and subsequent amendment in 16.11.2009, the proposed project falls in Activity 6(b), Category-B of "List of Projects or Activities Requiring Prior Environmental Clearance". The project would require environmental clearance from Ministry of Environment & Forest (MoEF), Government of India.

M/s BPCL has appointed Projects & Development India Limited (PDIL), a Government of India Undertaking, for preparation of EIA/ RA Reports for proposed project in order to seek environment clearance from MoEF. PDIL is a QCI-NABET accredited EIA consultancy organisation.

STRUCTURE OF EIA REPORT

The EIA report has been prepared and reviewed as per "Generic Structure of EIA/EMP/RA Report" required by the Ministry of Environment & Forest, Government of India as per the general condition stipulated in the EIA notification. The salient features of the report have been projected by identifying the environmental and ecological stressors. The Impact assessments have been reviewed by making compliance with the threshold limit of the

environmental and ecological stressors and other norms available through governmental or non-governmental agencies.

PROJECT PROPOSAL

The project proposal relates to construction of additional tankages for ATF & MS and pumps within the plant premises of existing Borkhedi POL Depot. The details of project proposal is as under:

Sl. No.	Name of Item	Qty	Cap. (KL)	Total (KL)	Grand Total (KL)
01.	**Additional Tankages**				
	Motor Spirit (MS) – A/G	1	3064	3064	11746
	Aviation Turbine Fuel (ATF) – A/G	2	4241	8482	
	Aviation Turbine Fuel (ATF) – U/G	1	200	200	
02.	**Decantation Pump, KL/hr**	2	350	-	-
03.	**Filling Pumps, KL/hr**	2	160	-	-

PROJECT LOCATION

Borkhedi POL Depot is located in south-western direction near Borkhedi Village at a distance of about 35 Km from Nagpur City under Nagpur Tehsil/district in the state of Maharashtra. The depot is spread over an area of 27.41 acres of industrial land provided by Govt. of Maharashtra. Geographically, the depot is located at 20^0 51'28.6" N latitude and 78^0 58'11.6" E Longitude at an altitude of about 269 m from mean sea level (MSL). The depot is well connected with road and rail communication. National Highway NH-7 is passing in southern direction at a distance of about 0.5 km away from the depot. The nearest Railway station is Borkedi railway station, which is located at a distance of about 1 Km.

BENEFITS OF PROPOSED PROJECT

Installation of additional tankages for ATF & MS shall yield following benefits:

- Maintain continuity of supply of ATF & MS to the consumers/Airport.
- Ease in availability of ATF to Airport which has gone very high due to increase in number of domestic as well as international flights from Nagpur.
- Provide adequate coverage to avoid dry outs and tank maintenance requirements.

OBJECTIVE OF EIA STUDY

The objective of the EIA study is to identify and evaluate the potential impacts (beneficial and adverse), and preparation of impact statement in accordance with existing guidelines of MoEF. The study would provide information on the environmental implications, which could be used for environmental safeguards. The EIA report shall be a document for getting environmental clearances from MoEF and other statutory agencies. The EIA report will also present the existing environmental settings vis-à-vis contribution of pollutants and other factors from the proposed facilities.

SCOPE OF EIA STUDY

The scope of this EIA study includes detailed characterization of pre-project status of environment in an area of 5 Km radius as per TOR approved by MoEF, New Delhi with the following important considerations:

- To assess the existing status of air, noise, water, land, biological and socio-economic components of the existing environment.
- To identify and quantify significant impacts of various operations on environmental components during construction & operation phases with respect to pre-project status.
- To evaluate proposed pollution control measures.
- To prepare Environmental Impact statement outlining additional control technologies to be adopted for mitigation of adverse impacts.
- To prepare QRA report for Borkhedi POL Deot

PROJECT DESCRIPTION

Existing Storage

Borkhedi POL depot has been provided with a total tankage/storage capacity of 18,157 KL of MS, HSD, SKO, LDO, FO, Ethanol and Bio-diesel. The depot comprises 10 nos. of above ground (A/G) tanks (Gross Capacity – 17,567 KL) and 7 nos. of underground (U/G) tanks (Gross Capacity - 590 KL). The details of storage facilities are summarized below in Table - E.1.

Table - E.1
DETAILS OF TANK SCHEDULE

Sr. No.	Tank No.	Product	Dia. (M)	Height (M)	Total Capacity (KL)	Type of tank
1	1	MS	11	14	1330	FIXED CONE
2	2	MS	11	14	1330	FIXED CONE
3	3	SKO	11	14	1330	FIXED CONE
4	4	SKO	11	14	1330	FIXED CONE
5	5	HSD	17	14	3189	FIXED CONE
6	6	HSD	17	14	3189	FIXED CONE
7	7	HSD	17	14	3189	FIXED CONE
8	8	HSD	11	14	1330	FIXED CONE
9	9	HSD	11	14	1330	FIXED CONE
10	10	MS	3.2	12.6 (L)	100	U/G
11	11	ETHANOL	3.2	12.6 (L)	100	U/G
12	12	SPEED	3.2	12.6 (L)	100	U/G
13	14	LDO	3.2	12.6 (L)	100	U/G
14	15	HSD	2.75	8.25	45	U/G
15	16	SKO	2.75	8.25	45	U/G
16	19	FO	2.0	6.75 (L)	20	A/G
17	13	BIO DSL	3.2	12.6	100	U/G

Storage tanks are provided with separate dyke enclosures based on product classification. The existing tanks are provided with CC/ brick pitching to the apron. All the storage tanks are provided with 2 nos. of gate valves in both inlet & outlet lines. MS tanks are provided with water sprinkler system. All the tank farms are provided with fire hydrants & monitors in addition to 02 nos. of foam trolleys.

Proposed Facilities

The project proposal relates to construction of additional tankage of ATF & MS and pumps. The details of proposed storage facilities & pumps have been discussed above. After implementation of the proposed facilities, the storage capacities of Borkhedi Depot will increase from 18157 KL to 29303 KL. This will in turn increase the number of days coverage and would minimise the dry out in case of emergent situations.

Fire fighting facilities

Salient features of the existing fire fighting facilities are as follows:

Table - E.2

Fire Water storage tanks	2 X 1870 KL
Fire Water pumps	3x455 m^3/hr
Jockey Pump	2x30 m^3/hr
Fire extinguishers	As per OISD – 117
Hydrants and monitors	As per OISD – 117

- Fire protection facilities are designed to fight one major fire as per design philosophy given in OISD 117. Water spray system are provided for Class A storage tanks and will be provided for Class B storage tanks proposed inside common enclosure for Class A tanks.
- Existing water storage capacity and fire pumps are adequate to meet the requirement of the additional tanks. Hence, no. additional Fire Water Tank has been envisaged in the project proposal.
- Safety distances between facilities are provided as per PESO/ OISD norms. Also, fire water tanks and pumps are located minimum 30 M away from risk area (including proposed tanks) as stipulated by OISD 117. Required number of firewater pumps and jockey pump are provided to take care of the fire hydrants. Four hours pumping capacity is provided as fire water storage in two tanks of 1870 KL each.
- There is a well laid out ring main system around the hazardous area which are provided with fire hydrant points and monitors as per requirements of OISD. In addition adequate numbers of portable fire extinguishers of dry chemical type powder & foam type are also provided.
- The proposed additional tanks shall also be provided with a fire hydrant system all around and water sprinkler system as required.
- Mock drills are conducted at regular intervals and the observations recorded. Personnel intended to operate the Depot are well qualified and well trained. Depot operations are supervised by a responsible Officer. The Depot personnel are well informed and well trained in fire hazards and fire fighting systems. Depot security system has been so envisaged to ensure strict compliance of safety requirements and to take up prompt and proper action in case of any emergency.

PROCESS DESCRIPTION

The petroleum products like MS, HSD, FO, SKO, Ethanol and Bio-diesel as usually shall be received at Borkhedi Depot through BTPN rail wagons from Manmad Terminal. The products shall be unloaded by connecting unloading hoses to tanker outlet nozzle and unloading manifold of respective pumps suction and finally stored in respective tanks of MS, HSD, FO, LDO, SKO, Ethanol and Bio-diesel.

From storage tanks, MS, SKO & HSD shall be pumped to TLF Bays which are provided with flow governor and flow meter and then to the loading arm for filling the tank trucks by PD meters. Sufficient space has been provided for parking of tank trucks. Tank trucks shall be properly earthed before starting the filling operation in TLF bays.

DESCRIPTION OF ENVIRONMENT & IDENTIFICATION OF ANTICIPATED IMPACT

Description of baseline environmental status and the impact on the existing environment after construction and operation of the proposed project have been discussed with respect to the following components of the environment. The status of important components of the environment and impact of project activities on them has been summarized below:

Land Environment

The proposed additional tanks for ATF & MS shall be installed in the vacant space available within existing POL Depot premises. As the proposed site is within existing premises of POL depot, hence there shall be no change in existing land use pattern. There shall be no solid and hazardous waste generation during project activities and consequently any adverse impact on land is not envisaged. Thus, there will be no change in the soil characteristics, land use pattern and landscape due to the construction & operation of the proposed facilities.

In order to evaluate the physico-chemical characteristics of soils, three sampling locations were selected to represent various land use conditions in the study area. Out of three locations, one was selected within project site and remaining two locations were identified from the villages located around the POL Depot. Highlights of some important parameters are as under:

- The pH of the soils ranged between 6.9 and 7.4.
- The electrical conductivity varied from 0.46 to 0.53 m-mhos/cm.
- The organic carbon ranged between 0.68 and 00.77%.
- Level of Nitrogen as N ranged between 286.54 and 312.54 mg/kg.
- Level of Phosphorous as P_2O_5 ranged between 4.1 to 4.8 mg/kg.
- Level of Potash as K_2O ranged between 106.58 and 166.96 mg/kg.

Climate & Meteorology

A meteorological station was installed for recording hourly wind speed, wind direction, temperature, relative humidity and rainfall measurements on the roof of security cabin of main gate of Borkhedi Depot. No deviation has been recorded with the secondary data related to meteorology and micro-climatic conditions. Besides this, the proposed project is a non-polluting developmental project and no adverse impact on the existing climate is envisaged.

Air Environnent

Existing Ambient Air Quality

The baseline ambient air quality status and expected air quality status for the proposed project are characterized using the following sources of data.

- Ambient air quality data from selected six sampling locations within 5 Km. radius of study area.
- Meteorological data collected for project site during study.

To evaluate the baseline ambient air quality, one season data generation was conducted at four locations around Borkhedi Depot including residential & rural area for a period of three months from January 2014 to March 2014. During the survey period, the concentrations of air pollutants namely PM_{10},SO_2, NOx, VOC, Methane & Non-methane Hydrocarbons in ambient air were measured.

The highlights of the results are presented below in Table no-E.3:

Table - E.3
Highlights of Ambient Air Quality Survey

Pollu-tants	Units	SA1		SA2		SA3		SA4	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
PM_{10}	$\mu g/m^3$	34	54	22	34	20	32	23	30
SO_2	$\mu g/m^3$	9.2	14.6	7.8	12.3	8.0	12.5	8.4	11.0
NOx	$\mu g/m^3$	13.7	21.7	12.2	18.6	11.8	18.5	13.2	19.7
THC	ppm	1.45	1.83	1.41	1.75	1.37	1.68	1.34	1.62
VOC	ppm	2.02	3.50	1.86	2.59	1.81	2.44	1.74	2.33

From the above, it is concluded that the measured values of the air pollutants, as stated above, are well within the limits specified under NATIONAL AMBIENT AIR QUALITY STANDARD for rural and residential areas.

Source of Air Pollution

Operation of the depot usually does not involve any chemical or manufacturing process, which may lead to process specific emission of air pollutants into atmosphere. The entire operation of receipt, storage, filling of products in tank lorries is carried out under closed circuit and leak proof system so as to avoid emission of hydrocarbon vapours into the atmosphere. However, it is also a fact whatever leak proof system is claimed there are minor leakages during unloading and loading of MS. For detection of leakages, HC detectors are installed in unloading and loading areas so that if the concentration of HC goes beyond specified limit the operation of unloading/ loading is stopped immediately. The intermittent sources of air emission are limited to DG Sets and fire Water pumps. DG sets are operated only in case of power failure during working hours. Further, under normal condition, the fire water pumps are operated during mock fire drills only. In the proposed project proposal, there is no proposal for installation of additional DG Set or Fire Water Pump.

Hence, establishment of proposed additional tankages for ATF & MS shall not impart adverse impact on existing air environment.

NOISE ENVIRONMENT

Noise monitoring survey was conducted at thirteen locations, out of which ten locations were selected inside the BPCL depot and three locations outside the boundary walls representing rural and residential areas. The noise monitoring results reveals that the noise levels vary from 43.1 dB(A) to 55.5 dB(A) during night and day time respectively primarily due to movement of vehicles on the roads near the site and surroundings. A little increase in the noise level during construction and operation has been envisaged. The duration of construction activities shall be for a period of 8 to 12 hours with maximum incremental noise level equivalent to 10 dB(A) which will correspond to 3 to 4 dB(A) on day and night levels. The incremental increase in the noise level during operation phase shall be 8 hours (one

shift). Hence, impact on the air due to noise shall be practically insignificant during construction and operation phase.

WATER ENVIRONMENT

Existing Water Quality

To evaluate the baseline water air quality, one season data generation was conducted at six locations around Borkhedi Depot for a period of thee months from January 2014 to March 2014. Two nos. of surface water, four nos. of ground water samples were collected and characterized for relevant parameters.

Summary of the observations are presented below in Table No-E.4:

Table - E.4
Summary of Observations of Water Quality

Parameters	Ground Water		Surface Water	
	Min.	Max.	Min.	Max.
Total Dissolved Solids	170	450	310	320
Alkalinity total as $CaCO_3$	110	370	232	236
Hardness total as $CaCO_3$	120	394	260	266
Chloride as Cl	16	30	18	22
Iron as Fe	0.08	0.14	0.06	0.06

The surface and ground water characteristics of the samples collected within the study area have been found well within the permissible limits laid down in Drinking Water Standards (IS: 10500-1991).

Water Consumption

Water consumption of the depot is summarized as under:

Table No-E.5
WATER CONSUMPTION

Sl. No.	Particulars	Quantity (m^3/day)	
		Existing	Proposed
a)	Domestic (Drinking, Sanitary etc.)	2.5	3.0
b)	Floor Washing	2.0	2.0
c)	Mock Drill (30KL once in a month)	1.0	1.0
d)	Gardening	0.5	0.5
	Total	**6.0**	**6.5**

Existing water consumption of POL Depot is 6.0 m^3/day. After establishment of the proposed ATF & MS tanks, water consumption may marginally increase from 6.0 m^3/day to 6.5 m^3/day. This increase would be due to increase in number of tank trucks coming to the depot for transport of petroleum products as well as increase in no. tankers for despatch of products (ATF & MS). Presently, water requirement is being met by two nos. of bore wells available within plant premises. Increase of water requirement of 0.5 m^3/day shall not impart negative impact on withdrawal of ground water from bore wells.

Wastewater Generation

The details of wastewater generation is summarized below in Table E-6.

Table No- E.6
Waste Water Generation & Disposal

Sl. No.	Particulars	Quantity (m^3/day)	
		Existing	Proposed
a)	Fire water make-up	0.5	0.5
b)	Floor washings	1.0	1.0
c)	Sanitary waste water	0.5	0.5
	Total	**2.0**	**2.0**

Presently, about 2.0 m^3/day of wastewater is generated from the depot. There would not be any increase in quantity of wastewater generation due to installation of proposed storage tanks. No wastewater is discharged outside the premises of Borkhedi Depot. Sanitary wastewater from toilets, canteen and wash room is treated in Septic Tanks and is disposed off through soak pits. The non-sanitary wastewater such as wastewater generated due to floor washings, mock drills etc. is passed through Oil Water Separator (OWS) for arresting the oil content. The oil free wastewater is being used quantitatively in gardening / afforestation. Hence, no adverse impact is envisaged from the proposed project on existing water environment.

BIOLOGICAL ENVIRONMENT

The proposed storage tanks shall be installed in the vacant land available within the existing premises of Borkhedi Depot. There is no point and non-point source of emission or discharge of pollutants and hence, no adverse impact on the biological environment is envisaged due to the proposed project activities and operation.

SOCIO-ECONOMIC ENVIRONMENT

The proposed project activity is limited to installation of 3 nos. of ATF tanks and 1 no. of MS tank and pumps. Construction of proposed facilities shall generate direct/indirect employment in local area. During the construction phase, local people shall be employed temporarily for construction works. Thus, significant positive impact on the socio - economic environment due to proposed project is foreseen. Moreover, the proposed project, during its operational phase would be able to bridge the gap between the demand and supply of MS in and around Borkhedi area and ATF for Nagpur Airport.

ANALAYSIS OF ALTERNATIVE (TECHNOLOGY & SITE)

BPCL has acquired enough experience in installation of receipt, storage and dispatch facilities in the POL Depot with inception of new technologies. The Engineering & Project Division of BPCL has been involved in successful installation and execution of many POL Depots all over the country. All these expertises of BPCL are well proven and working efficiently at different locations of the country without fail and as such no alternative technology was considered for providing such facilities.

ENVIRONMENTAL MONITORING PROGRAMME

A monitoring schedule with respect to Ambient Air Quality, Water Quality, Noise Quality, prepared in consultation with Maharashtra Pollution Control Board, is already being maintained by depot officials of Borkhedi and the test reports are regularly forwarded to the State Pollution Control Board.

ADDITIONAL STUDIES

No additional study is envisaged due to following reasons:

Impact on local infrastructure such as road network etc.

Presently, about 100 tank Lorries are daily loaded and sent to different authorized outlets, distribution networks from Borkhedi Depot. The existing road net-work around the Borkhedi depot is sufficient enough to sustain the traffic load. Due to addition of storage tanks of ATF & MS in the depot, 15 numbers of additional truck tankers (TTs) shall be despatched to different locations in the command area to fulfil the increased demand of petroleum products. Hence, no impact is envisaged due to movement of TTs from Borkhedi Depot to other areas.

Compensation package for the people affected by the proposed project

The project proposal is limited to installation of 3 nos of ATF tanks and 1 no. of MS tank within plant premises of existing depot. Hence, the proposed project does not involve any RR policy violation.

Proposed Plan to handle the socio-economic influence on local community

The proposed project shall not require additional manpower to handle the additional receipt, storage and delivery of petroleum products. Existing man-power is sufficient to handle the extra load. Hence, the proposed project shall not impart any socio-economic influence on local community. During construction period, only local man-power shall be engaged for installation of storage tanks. This would not impart any impact on socio-economic profile of the area.

The Risk Analysis Report has been prepared separately.

ENVIRONMENTAL MANAGEMENT PLAN

Construction Phase

During construction phase, all precautionary measures shall be taken for dust suppression, prevention of soil erosion and noise reduction. The effect due to construction activities will be temporary in nature and will have no permanent effect on the environment.

Operation Phase

The entire operation of receipt, storage and delivery is carried out under closed circuit and leak proof system so as to avoid emission of hydrocarbon vapours into the atmosphere. However, leakage of MS during unloading and loading cannot be ruled out. For detection of leakages, HC Detectors shall be installed at suitable locations.

Air Emissions

There is practically no source of air pollution in the proposed facilities. All the storage tanks shall be leak proof and products shall be handled through closed pipes and adopting proven technological art and options. The sources of atmospheric emissions shall be limited to the DG Set which shall be operated in case of power cut. Even when the DG set is operated, emissions of SO_2 and NO_x shall be within the threshold limit. The stack height of the existing DG sets has been kept as per prescribed standard. There is no provision for installation of additional DG Set or Fire Water Pump. To detect any leakage during unloading and loading operations of MS, HC Detector shall be installed in MS unloading and loading areas.

Wastewater Generation

There would be insignificant increase in quantity of wastewater after installation of proposed facilities. Sanitary waste water from canteen, wash rooms and toilets shall be treated in septic tank and disposed off through soak pits. Oily wastewater due to floor washing shall be sent to existing Oil Water Separator for arresting the oil content. The capacity of existing oil water separator is sufficient to sustain the increased load of oily wastewater, if any. The oil free wastewater shall be used quantitatively in gardening of afforested areas. Thus, no management plan is required for treatment of wastewater.

Afforestation Program

Borkhedi depot is conscious of importance of green belt. Different varieties of plants have been planted in vacant spaces near boundary walls. Suitable variety of flora species shall be planted in the available vacant spaces. Further, lawns and gardens will be developed with ornamental plants in vacant land within the depot. Out of 27.41 acres, about 9 acres area has already been brought under green belt development program.

Preventive Maintenance / Planned Inspection

Preventive maintenance and planned inspection of the facilities will be done in accordance with OISD and as per schedule. Record keeping for jobs done would be maintained. The intermittent inspection and maintenance schedule would be prepared as per directive and procedures laid down by OISD.

In addition to above management plan, the project will emphasize the following programs to catalyze the green economy of the nation:

Green Light Program

It involves installation of energy efficient lighting system which reduces indirectly generation of oxides of Carbon, Nitrogen and Sulphur. However, there shall not be any compromise with required illumination at working places.

Energy Star Program

Use of energy efficient electrical appliances including computer etc shall be encouraged. BPCL shall pay proper attention to improve the working environment by adopting the principle of Ergonomics in the following line of action:

"In order to maximise the working and skill capability of the work-men, the Environmental Management Plan considers the strategy and goal of Ergonomics. The application of ergonomics will reduce the Muscular Skeletal Disorder (MSD). ***Attempts shall be made to make the Working Environment to fit the Workmen instead of forcing a workman to adopt the Working Environment."***

CONCLUSION

Any adverse impact due to the proposed project on air, noise, water, land and ecological environment is insignificant and the socio-economic benefits are predominantly positive. It is also evident from the risk analysis study that acceptable individual risk level of 1.0×10^{-6}/ year is mainly confined within the plant boundary. All the relevant safety norms with latest technology shall be incorporated to ensure safe operation of the depot. In view of the above, it may be opined that the proposed project in totality may be considered environmentally safe.